

## CLAIMS

What is claimed is:

1. A purified interferon- $\alpha$  molecule that has interferon- $\alpha$  protein biological activity,  
5 comprising an amino acid sequence from an interferon- $\alpha$ 2c polypeptide, with a mutation of Ser to Tyr at amino acid residue 86 or 90.
2. The purified interferon- $\alpha$  molecule according to claim 1, wherein the interferon- $\alpha$ 2c polypeptide has a mutation of Ser to Tyr at amino acid residues 86 and 90.
3. The purified interferon- $\alpha$  molecule according to claim 1, comprising at least  
10 residues 86 to 90 of the interferon- $\alpha$ 21a polypeptide.
4. The purified interferon- $\alpha$  molecule according to claim 3, comprising at least residues 82 to 95 of the interferon- $\alpha$ 21a polypeptide.
5. The purified interferon- $\alpha$  molecule according to claim 1, wherein the purified interferon- $\alpha$  molecule is a hybrid interferon polypeptide comprising one or more segments of  
15 interferon- $\alpha$ 2c and interferon- $\alpha$ 21a.
6. The hybrid interferon polypeptide according to claim 5, wherein the hybrid comprises at least amino acid residues 86 or 90 of interferon- $\alpha$ 21a.
7. The hybrid interferon- $\alpha$  molecule according to claim 6, comprising an amino acid sequence with a structure M-N-O-P, wherein M comprises about amino acid residues 1-75 of  
20 interferon  $\alpha$ 21a, N comprises about amino acid residues 76 to 81 of interferon- $\alpha$ 2c, O comprises about amino acid residues 82 to 95 of interferon- $\alpha$ 21a, and P comprises about amino acid residues 96 to 166 of interferon- $\alpha$ 2c.
8. A hybrid interferon- $\alpha$  polypeptide, comprising an amino acid sequence selected from the group consisting of:  
25 (a) an amino acid sequence as set forth in SEQ. ID NOS: 9, 11, 13, 30, 32, 34, 36, 38, 40, and 42;  
(b) amino acid sequences with a structure X-A-B, wherein X comprises about amino acid residues 1-75 of an interferon- $\alpha$ , A comprises about amino acid residues 76-95 of IFN- $\alpha$ 2c, and B comprises about amino acid residues 96-166 of IFN- $\alpha$ 21a;  
30 (c) amino acid sequences with a structure X-A-Y, wherein X comprises about amino acid residues 1-75 of an interferon- $\alpha$ , A comprises about amino acid residues 76-95 of IFN- $\alpha$ 2c, and Y comprises about amino acid residues 96-166 of an interferon- $\alpha$ ; and  
(d) amino acid sequences with a structure V-C-Y, wherein V comprises about amino acid residues 1-81 of an interferon- $\alpha$ , C comprises about amino acid residues 82-95 of IFN- $\alpha$ 2c, and Y comprises about amino acid residues 96-166 of an interferon- $\alpha$ ,  
35 wherein the hybrid interferon- $\alpha$  polypeptide has interferon- $\alpha$  protein biological activity.

9. The hybrid interferon- $\alpha$  polypeptide according to claim 8, comprising one or more segments of interferon- $\alpha$ 21a and interferon- $\alpha$ 2c.
10. The hybrid interferon- $\alpha$  polypeptide according to claim 8, comprising an amino acid sequence selected from the group consisting of an amino acid sequence as set forth in SEQ ID NOs: 9, 11, 13, 30, 32, 34, 36, 38, 40, and 42.
11. The hybrid interferon- $\alpha$  polypeptide according to claim 10, wherein the sequence is selected from the group consisting of an amino acid sequence as set forth in SEQ ID NOs: 9, 13, 32, 34, 36, and 38.
12. The hybrid interferon- $\alpha$  polypeptide according to claim 8, comprising the amino acid sequence with a structure X-A-B, wherein X comprises about amino acid residues 1-75 of an interferon- $\alpha$ , A comprises about amino acid residues 76-95 of IFN- $\alpha$ 2c, and B comprises about amino acid residues 96-166 of IFN- $\alpha$ 21a.
13. The hybrid interferon- $\alpha$  polypeptide according to claim 8, comprising the amino acid sequences with a structure X-A-Y, wherein X comprises about amino acid residues 1-75 of an interferon- $\alpha$ , A comprises about amino acid residues 76-95 of IFN- $\alpha$ 2c, and Y comprises about amino acid residues 96-166 of an interferon- $\alpha$ .
14. The hybrid interferon- $\alpha$  polypeptide according to claim 8, comprising amino acid sequences with a structure V-C-Y, wherein V comprises about amino acid residues 1-81 of an interferon- $\alpha$ , C comprises about amino acid residues 82-95 of IFN- $\alpha$ 2c, and Y comprises about amino acid residues 96-166 of an interferon- $\alpha$ .
15. A nucleic acid molecule encoding a polypeptide according to claim 8.
16. A recombinant vector comprising the nucleic acid molecule according to claim 15.
17. A cell transformed with the recombinant vector according to claim 16.
18. A pharmaceutical composition comprising:  
a pharmaceutically acceptable vehicle or carrier; and  
at least one hybrid interferon- $\alpha$  polypeptide according to claim 8.
19. A method for treating a patient having a viral disease, comprising administering to said patient a therapeutically effective amount of at least one hybrid interferon- $\alpha$  polypeptide according to claim 8.
20. The method according to claim 19, wherein the administration is by injection.
21. A method for regulating cell growth in a patient, comprising administering to said patient a therapeutically effective amount of at least one hybrid interferon- $\alpha$  polypeptide according to claim 8.
22. The method according to claim 21, wherein the regulated cell growth is tumor cell growth.
23. The method according to claim 21, wherein the administration is by injection.